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## STAINED GLASS WINDOWS.

GLASS as a material admitting in its composition any tints of color—these being dependent for their best effects on its translucency—affords to the designer an inexhaustible field for rich artistic effects. A writer of the 12th century, referring to glass windows then introduced from France into England, notes as their leading advantages the “keeping out of birds and rain,” having probably in mind the circumstance that light could be obtained without them by means of simple apertures. Uniformity of color is valuable in glass when it is used as a medium for looking through but not for decoration, for the purposes of which no variety in tint or difference in material, as affecting rays of light, can be too great, this variety adding to the repertoire for skilled effects. These effects are further enhanced by changefulness of hues according to atmospheric variations. Purity of color not being essential, even hueless and striated having their value, important contributions are received from new forms of glass as the iridescent, opalescent, Venetian (in which the colors flow into one another), the Florentine and other descriptions.

Antique glass of striated gelatinous appearance, of peculiarly delicate and rich tones in misty and cloudy effects, is most advantageously used in paneled arrangements for dwellings. The varieties of material to which we have referred has greatly aided the rapid extension of the introduction of glass into private residences. With the more pretentious architecture of the present day, and with the freedom and picturesque effects of the Renaissance style, now in the ascendant, stained glass comes into complete accord in subdued and well-balanced compositions, presenting that reposeful appearance constituting the triumph of art in this line.

In former times far more ambitious than are now sought for, designs involving the labor of years, were carried out, and still excite unbounded admiration for the harmonious whole resulting from so much detailed work. These are now chiefly found in European cathedrals, churches and abbeys. In mansions of the nobility entire historic episodes were thus portrayed. Chaucer refers to windows “full clear” in which

“The siege of Troy was in the glazing wrought.”

The present century has a brilliant record in the advance that has been effected in the production of stained glass both as to colors and artistic composition. With fashion and taste inclined to rich decoration, the art has assumed much of its ancient position in skilled elaboration and workmanship. Previously this important industry had fallen into decadence both as to color and styles, but by chemical investigation lost secrets in the rendering of certain brilliant hues have been recovered, so that stained glass now approaches in beauty, brilliancy, and durability that of earlier times. The skill of modern art is at ease as to technicalities. There is a certain community, or discoverable sense of affinity, between all branches of art, and stained glass, which has been poetically spoken of as “placing the beauty of the rainbow and power of the sun at the disposal of the artist,” is certainly an admirable accompaniment to architectural enrichments. Besides, there is a movement or life in color, which tends to break up or relieve structural monotony.

There exists only a general analogy between the treatment of glass in composite designs and oil painting on canvas. With canvas the space is open; with stained glass strips of lead unite pieces of distinctly separate color and tones of color. On canvas any figures may be exquisitely shaded off, and the distance between one object and another be shown by proper adaptations of atmospheric effects, which supply, in addition to form, the necessary perspective; roundness of form and atmospheric distance are indicated by uniting strong colors with delicate tones, and by modulations derived from stippling and shading. A

stained glass window composition must be treated according to refractiveness and translucency, certain colors such as ruby, green, and shades of white being especially selected for chiaroscuro effects, in obedience to the law which runs in the simple sequence of high lights, half tints, reflected lights and cast shades.

The coloring of the glass is effected by the oxides of different metals. Thus blue is obtained

proportions; purple is obtained from oxide of manganese; a faint purplish hue is obtained by adding soda and potash, whilst potash, in place of the soda, furnishes a bluish purple; brown purple comes from a mixture of oxide of manganese and oxide of iron; yellow is a mixture of different proportions of the last oxides, burnt sawdust added imparting an orange hue; glass may also be tinted yellow by applying a mixture of ochre and sulphate of silver, and baking it in an oven; a greenish black is made by the blending of oxide of copper and oxide of iron; the yellow oxide of uranium added furnishes a yellow green; red or ruby by the oxides of copper, lead, and tin and iron, melted in a batch with borax; ruby color is not developed until the glass has been repeatedly heated; the base of opal is crysolite, white sand, and oxide of iron.

When glass is merely coated with enamel color and burnt on, we have enameled glass; when stained throughout or with colors stained in the kiln, the material is termed pot-metal glass; the latter has greater depth and brilliancy than the enamel colors painted in.

In the production of a design in stained glass, the subject is first drawn on a cartoon. The hues of the various parts having been selected, a cutting drawing is next traced, consisting of the various intricate pieces marked with their respective colors, and which are ordinarily more numerous than would be surmised by any one who glances at the finished window. The design is then laid out on a table and glass is cut to pattern, the different colored pieces being successively laid in their proper places in the drawing. After the work is cut, shadows and other details, depicted on the cartoon, are added. The portions needing additional color are taken and painted separately by hand, and after being lightly baked are brought back to their original places in the design. In baking, some portions of the colors evaporate, and it is necessary for the permanency of the colors in various dark shades that these have several coats, each one being separately fired, as enough density cannot be secured at one firing. Brown enamel colors, more or less dense, are usually employed for stippling and shading. Finally the work is now burnt in a kiln, the colors on the melting of the surface sinking into the body of the glass. The final operation consists in placing the pieces on the full-sized drawing.

The leaden bands are then applied to unite the pieces, their best disposition being that of separating the figures from the background and aiding in the shade of folds of drapery. They improve the general depth of tone and add to the tenderness of the coloring. Lead lines represent the lines of the drawing and the pieces of glass supply the coloring, and connecting them by a lead in the form of an I, the pieces filling on each side of the central part. The lead is then soldered and the whole work cemented. In a well-arranged design the lead will not mar the effect by being too prominent.

Among methods adopted for shading or varying the tones of stained glass are those of obscuring the light in the required portions of the design, by etching with and roughening the under surface; or where white glass has a layer of color, grinding this upper surface to a semi-opaque white, whilst for intensifying the hue, and otherwise changing the tint, and giving shadows and tones, enameled colors are burnt. Additional brilliancy to parts can be given by staining with the oxide of silver in shades of yellow from pale to a deep amber. Ruby is ordinarily a flashed glass, unless it be gold ruby; brown is the general enameled color used, green and white are the colors mainly relied on for chiaroscuro, in obedience to the law which runs in the simple sequence of high lights and half tint shades, reflected light and cast shadows.

One style of ornamentation on glass is that which has a ground of opal glass, on which thin coatings of blue and rose pink glass are spread successively. By a wheel, the management of which requires great skill, the outer coats of color



The subject of this magnificent hall window is Hero and Leander; they are represented as having met in a garden at night, the full moon half hidden by flaky clouds, while here and there a star; in the back ground is a wall, surmounted by a balustrade of marble and tropical plants, flowers and foliage grow in luxuriant profusion, a beautiful pomegranate tree, laden with luscious fruit, throws its branches above the wall, and Hero and Leander are standing on a tessellated pavement. The figures are exquisitely painted by a Munich artist, and the back ground, with foliage, etc., is composed entirely of the opalescent and antique glasses in mosaic; altogether it is one of the most beautiful windows that has ever been made in this country.

by the mixture of cobalt and the red oxide of iron in different proportions according to the depth of hue required; smoke color by the blending of oxide of copper, iron, and manganese; black, by mixing the same oxides in different



are cut more or less into according to the design. This etching does not preclude the application of vitrifiable colors. This engraved colored glass admits of beautiful effects. The painting of pictorial scenes on light tinted glass grounds has reached, in the hands of many artists, points of highest excellence. Glowing color and exquisite gradations of light and shade compensate for the flowing freedom of form seen on canvas. The metallic oxides being incorporated in firing, we have much of the effects of oil painting with the difference that these are seen as transparencies and not by reflective light.

There is no compartment of a house which cannot be improved by stained glass. By the insertion of stained glass panels in the intervening doors of two apartments, one of which has windows more favorably situated for light than the other, that light may be in part shared; and the same is true as to this application of stained glass to doors that separate apartments and passages.

Long narrow upper colored lights constitute a charming addition to rich patterned portières, doing a like service, whilst the transoms of stained glass windows, as regards their prevalent tone of color should always accord with the character or purpose of the room thus decorated. The radiance of the light must be such as will not overpower the dominant tone of the interior but conform to the colors presented by interior surfaces and objects.

Breadth of tone gives a certain power, and well contrasted colors vigor of effect. The window will, nevertheless, be faulty if showing strong, pure, positive colors in large masses, such colors needing to be sparingly used and well distributed, and as a general rule well cut up in the leading. It is here the value of effects comes in. All clerestory and closed windows are done with extra heavy bold effects, and their distance requires clearness to save from indistinctness. In borders of windows winding stems with intermediate spaces filled with leaves and here and there a flower or small mosaic paneled figures in tints showing harmonizing contrasts, will be becoming. A good treatment of border is the acanthus leaf alternating with a four-leaved flower with stalk. With the closest imitation of nature, even to the representation of veins and the serrated edges of leaves, the effect will be spiritless and weak, unless there is a compact grouping of leaves. Good judgment must be used as to whether the work is bold or delicate in treatment, dependent on the size of interiors, on position and point of observation. If high up, if lower.

Nature is a source from which art draws,

but art does not depend on exact representation; so far as it is realistic it should merely suggest approximation to the type. Hence conventionalized treatment of natural objects in leaves, flowers, stems and tendrils are those best suited to glass. Ornament is to be considered as an offshoot from nature suggestive of its beauties, which no shaded forms can possibly represent, thus confining the portrayal to line, tint, and tone. The hawthorn, the passion flower, the buttercup, the wild geranium, and other vegetable forms, whilst treated conventionally may be effectively blended with various geometric forms.

Every one admits that the best coloring effects to be brought out are those which accord with nature. It is essential colors should harmonize, and it is to be remembered that there are harmonies of contrasts—complementary colors uniting the strongly contrasting hues in a tender gradation of tints.

Color being dependent on light for its display, a stained glass window will lose a good portion of its charm by being exposed to a reflected instead of a direct light, besides possibly contributing an undue amount of obscurity. A magnificent window in dark rich-toned hues in the side wall of a stairway screened at the distance of a few feet by the wall of another structure, will yield little but a sense of oppressive gloom, whereas if supplied by abundant light it may have an enriching effect in agreement with gorgeous paper hangings, carved banisters picked out in gold and colors and the fire gilt standards terminating them. An illustration is afforded in two splendid examples of

stained glass windows in the Church of St. Bartholomew, opposite the Grand Central Union Depot, New York, in positions where their proper effect is destroyed by the interference of surrounding buildings, rendering them semi-opaque.

A window, the colors of which would come out clearly against the sky, will be almost deadened by a background of trees, be their green ever so exquisite. Too abundant light in an interior will often prevent a stained window being seen at its best, owing to refraction. The colors in such case will lose in effect their inherent vividness; some tints will appear too pallid, and others, though thus reduced in tone, too assertive. To obviate this effect, the windows are double glazed in parts where there is too much light, two thicknesses of glass being inserted.

For large interiors strong, positive, and brilliant colors with powerful contrasts and bold treatment are in place. Of styles of stained windows for ecclesiastical purposes are geometric forms with colored borders, pictorial representations illustrative of scriptural events in groups of figures, in emblems of faith, and in medallions separately represented; with a tableau of figures, a canopy foliage well rendered is always pleasing. When windows have a northern exposure and consequently no sun, brilliant colors such as pure yellow to amber will give the effect of its beams. In parlors or reception rooms only the upper lights of the windows, or the portion round body of window, need to be filled in with stained glass. Geometrical forms above, set in small panels, will have a good effect.

Folding fire screens of pot-glass metal have the advantage of being seen in day time by refracted light, and a capacity of adding any needed quota of color of any tints that may be required to heighten or otherwise modify the dominant tone of the interior. As to general arrangement of the design, a good effect may be brought out by a central decorated panel set round with minor lights, the upper and lower portion being divided off by roundels. The better to explain the differ-



No. 2.

ent treatment of glass, we reproduce a few familiar illustrations. Below is a panel showing the lead lines disposed in consonance with a design so as to present no harsh effects with the same panel filled out in colors.

The accompanying cut, No. 1, is a chancel window showing magnificent grouping of figures with architectural canopy. The figures in the foreground are scenically separated from the background by the device of another arch with gallery, from which spectators view the scene of the presentation of Christ in the Temple. The disposition of the leads, so abundantly breaking the sky and yet allowing of a lightsome atmospheric appearance in contrast with the massive arch that forms the canopy displays a masterly hand.

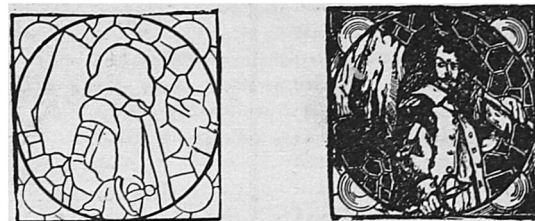
The effect of leads in affording a striking sense of perspective is well depicted in the following design, No. 2. In stained glass windows the effect of figures, single or in groups, will never fail to be heightened by a rich canopy. An illustration has been already given, and another is here added in No. 3. Such canopies add to the dignity of the portraiture, and are especially suited to memorial windows. It is, indeed, in memorial windows, the best and most permanent tributes of affection, that stained glass designs have found one of their most important fields for development in church decoration. It is to be added that for household



No. 3.



No. 1.



EXAMPLE OF WINDOW WITH LEAD LINES BEFORE AND AFTER BEING PAINTED.

adornment stained glass never goes out of fashion. In this line its full artistic value is only now being fully realized.

A PAINTED arras in a large hall is particularly effective. It should be fastened with hooks and rings to a rod, that should run below the frieze.